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Guidelines for Authors

Proposed articles should be double-spaced text in 10- or 12-point Arial or Helvetica type fonts, left margin justified. To ensure that design layout conforms to Forest Service publication standards, submit graphic elements, such as tables, charts, and photographs as separate files. Submit manuscripts as Microsoft Word documents (either Macintosh or Windows format) on 3.5-inch floppies, Iomega products (ZIP 100), or recordable CDs, or send by e-mail.

When soliciting photographs for your document, encourage photographers to capture the sharpest image possible by moving close to the primary subject, so that it fills at least three quarters of the frame. Request vertical and horizontal photos in at least three different exposures for each subject to allow maximum design flexibility. (For cameras that lack adjustable f-stop lens settings, use the +/- exposure adjustment for different exposures.)

Photographers must use digital cameras that provide print or publication quality images. Provide 1-megabyte .jpeg files (for electronic use) or 5-megabyte .tif files for print publications. Designers can convert .jpegs into .tif files for professional page layout.

Use of Kodak photo CDs, Agency-provided desktop scans, or images from online sources are not recommended. Such images often have insufficient clarity (required minimum resolution is 300 dpi or dots per inch.) Internet photos generally only have a resolution of 72 dpi.

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Follow USDA guidelines for current information on including photographs in your document. See www.usda.gov/agency/oc/design/ for current information.

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2. Transparencies (4 by 5 inches or larger, preferably multiple frames of each subject) should be housed in archival slide sheets.
3. Prints (4 by 5 inches or larger, glossy finish, black and white or color format).

For additional information on preparing documents for the Engineering Management Series, contact Sandy Grimm, Engineering Publications. Phone: 703-605-4503, E–mail: Sandra Grimm/WO/USDAFS@FSNOTES or sgrimm@fs.fed.us.

Deadline for issue Number 2, 2003 EFN submissions: August 29, 2003

A Mandate To Work Effectively and Efficiently

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Washington Office

Another winter and spring are almost over, and the field season is here. Before you begin your field duties, I ask you to revisit how you can do your jobs efficiently, effectively, and safely. Your safety and that of your fellow workers always must be your number one priority. Please always take that additional moment to think about your safety and to ensure that you have the proper equipment with you.

This issue of *Engineering Field Notes* represents an exciting first—EFN now is coming to you electronically. As we continue to look for ways to free additional funds for other uses, we all must search for areas in which we can be more efficient. We are being more efficient and saving precious funds by distributing *Engineering Field Notes* electronically, and we are meeting one of the Presidential Management Agendas: E-Government. Also in this issue, we are introducing two new columns: Engineering Bulletin Board and EFN Forum. I encourage you, as you look at the new format and media, to provide us with some honest feedback. For *Engineering Field Notes* to continue to be successful, we need your participation. I know many of you are doing work that is significantly different or on the cutting edge. Please consider writing about your experiences so that others can learn from you and the USDA Forest Service can become more effective and efficient.

In this issue we formally announce our national award recipients for the year. Again, we had a tough time deciding who the national winners should be. The competition was extremely competitive, representing the top employees from each region. I wish we could give each nominee an award! We did bestow an unprecedented "Special Recognition" award this year to Raleigh Meadows from Region 8 for his longtime, outstanding engineering career. I urge you to read about this year's winners on page 27.

Just as I have stressed our efforts to become more effective and efficient in providing high-quality public service, I am also stressing a big challenge we have this year: the President's Management Agenda item "Competitive Sourcing." When the National Leadership Team made the decision to submit a portion of the maintenance function for competitive sourcing, we became actively involved in this process. To compete now and in the future, we need to determine how we can become more efficient and effective. You can help determine how best to attain and keep a competitive edge by providing input to your regional engineers. Now is the time to think outside the box and envision how our organization can be more effective in helping you do your jobs better.

The Washington Office (WO), regions, and forests are working hard to position our maintenance units so they can be the competitive winners in this competitive sourcing process. We are working hard to ensure that we have a better, stronger, and more appropriate organization at the end of this activity.

I also mentioned the need to become more effective and efficient because our scorecard from the Office of Management and Budget for management of USDA Forest Service infrastructure was not what we wanted it to be. Although we did well in overall management, planning, and purpose, we received less than satisfactory grades for results and accountability. As a result, our fiscal year (FY) 2004 budget has been decreased by $28 million in our construction and maintenance categories. We must direct more of our funds to accomplishing work, not just to paying for organization and planning. The Chief's focus on process predicament should help significantly in moving us in a more positive direction.

This spring and summer, we are facing the following two additional challenges:

- Sustaining the audit by getting our inventory and condition survey databases up to date
- Awarding and accomplishing projects delayed by funding fire season demands along with FY 2003 projects

I urge you to consider carefully how you plan your work. Focus on the priorities. Position your region, your district, or your forest to accomplish priorities early in spite of disruptions that are sure to come.

Take an active role in addressing the challenges I have mentioned. Help us have a safe, satisfying, and productive field season.

EFN Forum

Engineering Field Notes' new electronic format is a more flexible tool for sharing engineering news. Readers can submit traditional full-length articles that incorporate links to other sites or resources and employ appropriate color graphics.

EFN is also expanding its coverage to enable authors to submit letters to the editor by e-mailing Sandy Grimm at SandraGrimm/WO/USDAFS@FSNOTES or sgrimm@fs.fed.us. We welcome your feedback.

An Engineering Bulletin Board column, introduced in this issue, will enable engineers to share noteworthy engineering information that does not warrant a full-length article, such as notices about Web sites or publications that hold valuable engineering information. You can help us keep readers up to date as priorities change and new information surfaces. As an additional reader service, the bulletin board column also will chronicle career changes and opportunities for engineers in the Washington Office (WO) and the detached units.

We know that outstanding engineering work occurs daily. When your work saves the USDA Forest Service time and money in producing a high-quality product or service, let us know. Your report of outstanding work is a potential EFN article. Are you presenting a paper at a professional meeting? Consider submitting it to EFN. Are you responsible for training your fellow engineers? You could share the handouts you've already prepared with the EFN audience.

Did you receive an award for completing an engineering project? Tell the EFN audience what was special about your work. Can other engineers apply your successful approach or process or technique to their work? Would your innovations make their work in other applications more effective, less costly, or less time consuming?

Use your resources wisely by recycling valuable information that has reached only a limited audience. Other engineers are thirsty for information and curious about how others do their job. Your contribution might provide just the information, perspective, or impetus to overcome an obstacle, formulate a solution, or develop an outstanding engineering project.

Landslide Computer Modeling Potential

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The Payette National Forest selected the Stability Index Mapping (SINMAP) model for use in identifying landslide prone areas. The USDA Forest Service publication, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System, mentions SINMAP as a tool for analyzing the potential for shallow landsliding, the most dominant form of soil mass movement and sediment delivery for Payette National Forest lands. The SINMAP model is an ArcView extension that computes and maps a slope stability index based primarily on digital elevation data in the Geographic Information System (GIS). Landslide data collected in West Central Idaho from the 1997 New Year's Day storm event is being used to calibrate the input parameters of the SINMAP model.

Background

Identifying landslide-prone areas is a recent requirement for land management activities for most western national forests. Recent management direction on landslides and landslide-prone areas is included in PACFISH, USDA Forest Service 1994; INFISH, USDA Forest Service 1995; Chinook Salmon Biological Opinion, USDI National Marine Fisheries Service 1995; Steelhead Biological Opinion, USDI National Marine Fisheries Service 1998; and Bull Trout Biological Opinion, USDI Fish and Wildlife Service 1998. Additional emphasis on proper watershed health, together with restoration management, sustainable forest ecosystem management, and forest roads, is identified in the USDA Forest Service's Natural Resource Agenda for the 21st Century, USDA, 1998.

Program and project level analysis to determine potential landslide-prone areas requires a consistent, science-based process that is both adaptable to local conditions and reproducible over large geographic areas, which requires a foundation in a GIS environment. Ground slope and contributing drainage-area data from a GIS digital elevation model (DEM) is also important. The SINMAP model, which runs as a spatial analyst extension on the PC version of ArcView, met these needs (Pack et al 1998). SINMAP, which is available on the Internet, was developed in British Columbia with the support of the Canadian government. SINMAP has its theoretical basis in the infinite slope stability model with wetness obtained from a topographically based steady state of hydrology. These components are combined with an accounting for parameter uncertainty to define the stability index (SI). The model uses landslide initiation points in GIS to calibrate input parameters to the model.

Study Area

The 1997 New Year's Day storm in West Central Idaho caused numerous landslides. Landslides and flooding closed many roads, isolating rural communities until emergency road repairs were made. The small community of Lower Banks was abandoned due to the threat of future landslides.

The Payette National Forest also had numerous landslides resulting from the 1997 New Year's Day storm on basalt lands (where information on landslides was lacking). The forest conducted an aerial photo inventory supplemented with ground sampling in areas with a high occurrence of landslides on primarily basalt geologies, mapped the initiation points of the landslides, and put the data into the GIS. In an inventory area of 294 square miles, 483 landslides were identified. Typically, the area has mixed conifer forests on the north and east aspects with scattered timber intermixed with brush and grasslands on the south and west aspects at elevations of 3,500 to 6,000 feet. Below 3,500 feet elevation, the south and west aspects are typically grass and low brush with scattered timber and brush on the north and east aspects. The inventoried area was 60 percent forested and 40 percent nonforested. The typical area soils were classified as colluvial soil composed of angular rock fragments, silts, sands, and clays 2 to 6 feet deep.

Figure 1. Medium-sized landslide in brush on basalt soils.

Only 15 percent of the landslides inventoried appeared to be influenced by management activities such as roading and timber harvest. Eighty-five percent of the landslides occurred in brush and grass vegetation areas, while only 15 percent occurred in timber. North aspects had a much lower occurrence of landslides (7.5 percent) compared to south (26.3 percent), east (26.7 percent), and west (39.5 percent) aspects.

Landslides appeared to be influenced by the bedding planes of the basalt flows, often occurring along bands that paralleled the planes. Landslide occurrence also corresponded to the dip slope of the basalt bedding planes. The contact zone between the "upper" and "lower" basalt had a higher occurrence of landslides. Steep slopes (60 percent average ground slope), with a concave shape where water tends to collect, typically spawned more landslides.

Testing

Armed with our landslide data in GIS, we tested the SINMAP model at Boise State University with the assistance of the Rocky Mountain Research Station in Boise, ID. The SINMAP modeling is based on DEM data and landslide initiation points. The model generates and maps stability indexes for the pixels in the DEM. Pixel sizes used in DEMs vary. We used a 30-meter DEM, which means that each pixel represents 30 meters on the ground. Landslide initiation points are used to calibrate the model interactively with the computer screen. We omitted road-related and stream-cut landslides from the calibration process. They fail to fit the criteria of the infinite slope stability equation, because their geometry has been altered. In addition, the 30-meter pixel size cannot accurately represent ground slopes on fills, cuts, and slopes directly adjacent to streams because the slope changes occur in areas less than 30 square meters.

Table 1 shows the results the modeling yielded after calibration for the Upper Weiser River drainage.

Table 1—Upper Weiser River SINMAP Statistics.

Stability Class	Stable	Moderately Stable	Quasi-Stable	Lower Threshold	Upper Threshold	Defended	Total
Region 1							
Area (km^2)	76.9	26.2	29.4	30.8	3.0	0	166.3
Percent of Region	46.2	15.7	17.7	18.5	1.8	0	100
Number of Landslides	3	2	2	66	31	2	106
Percent of Slides	2.8	1.9	1.9	62.3	29.2	1.9	100
Landslide (Number/km^2)	0	0.1	0.1	2.1	10.5	41.9	0.6

The input parameters were:
T/R—250 to 1,500
C'—0.05 to 0.15
Phi—34 to 43

The term T/R is the ratio of transmissivity to the effective recharge rate of the storm being modeled or the slope distance required for soil saturation on a straight slope. The term C' is a dimensionless cohesion, a combination of root and soil cohesion divided by soil depth. Phi is the internal angle of friction of the soil. The SINMAP model uses uniform probability distributions of the input parameters with lower and upper limits. This approach reflects the uncertainty associated with estimating parameters in terrain stability mapping (Hammond et al 1992).

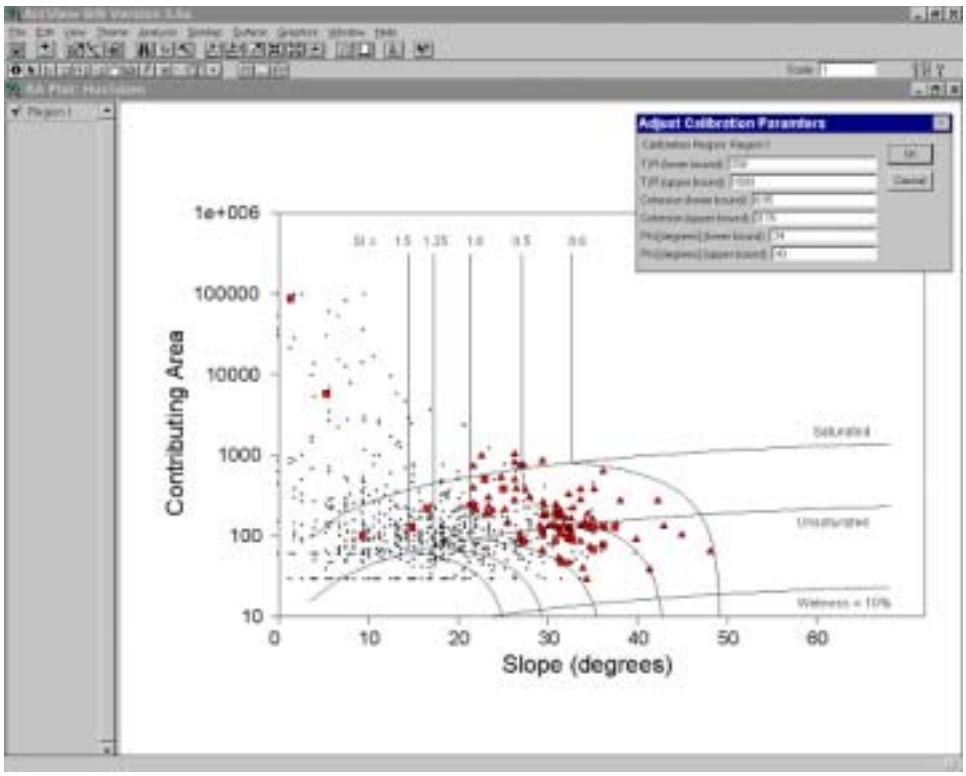

Figure 2. Upper Weiser River slope-area plot.

The slope area (SA) plot shows the relationship between contributing areas and groundslope (Tarboton 1997). The geometric points (little squares or triangles) represent landslide locations. The single points represent a random selection of points within the calibration region. The slope and contributing areas are generated from the DEM. The vertically oriented curves are the breaks between stability index areas.

- Points to the left of the SI line of 1.5 are in the stable region.
- Points between 1.5 and 1.25 SI lines fall into the moderately stable region.
- Points between the 1.25 line and the 1.0 line fall in the quasi-stable region.
- Points between the 1.0 and the 0.5 line fall into the lower threshold region.
- Points between the 0.5 and the 0.0 line fall into the upper threshold region.
- Points to the right of the 0.0 line fall into the defended region.

The location of the 1.0 SI line is controlled by the lower bounds of the C' and Phi parameters. The location of the 0.0 SI line is controlled by the upper bounds of the C' and Phi parameters. The area between the 0.0 SI line and the 1.0 SI line represents the uncertainty associated with the parameters.

The horizontally oriented lines represent the wetness that is controlled by the T/R calibration parameter. All points above the upper line are saturated. The position of the upper line is controlled by the upper bounds of the T/R ratio. The position of the middle line is controlled by the lower bounds of the

T/R ratio. Points between the upper and middle lines fall into the possible saturated area that represents the uncertainty associated with the T/R ratio. Points that fall below the middle line are unsaturated. The bottom line represents 10 percent wetness.

Calibrating the input parameters to the landslide points involves shifting the lines of the SA plot to fit the landslide occurrence by changing the upper and lower boundaries of the input parameters. A stability index of 1.0 may be thought of as a factor of safety. Very few landslides should occur to the left of the 1.0 line since the factor of safety is >1.0. These landslides can be identified on the stability index map from the SA plot using the (REX) tool in the SINMAP program. The REX tool is a Golden Retriever icon on the tool bar that enables the user to click on a landslide on the SA plot and find the same landslide point spatially on the stability index map. Landslides that had a SI > 1.0 were checked for slope and were found to be near stream bottoms where the 30-meter grid averaged the slope on both sides of the stream, resulting in erroneous slope readings when compared to the inventoried slope of the landslides.

Table 1 shows the results of the calibrated model. The stable regions with a SI > 1.0 have very low landslide densities. Landslides in that region (left of the 1.0 line) were attributed to the 30-meter DEM being unable to accurately show abrupt slope changes that are found in drainage bottoms. The lower and upper threshold regions show an increasing density of landslides with decreases of SI values < 1.0.

The initial SINMAP tests were done with a single calibration region. The model allows up to 10 calibration regions based on logical areas designated in GIS. For the Upper Weiser River area, we did further analysis using three calibration regions based on geology; “Upper Basalt,” “Lower Basalt,” and a 150-meter band around the contact zone.

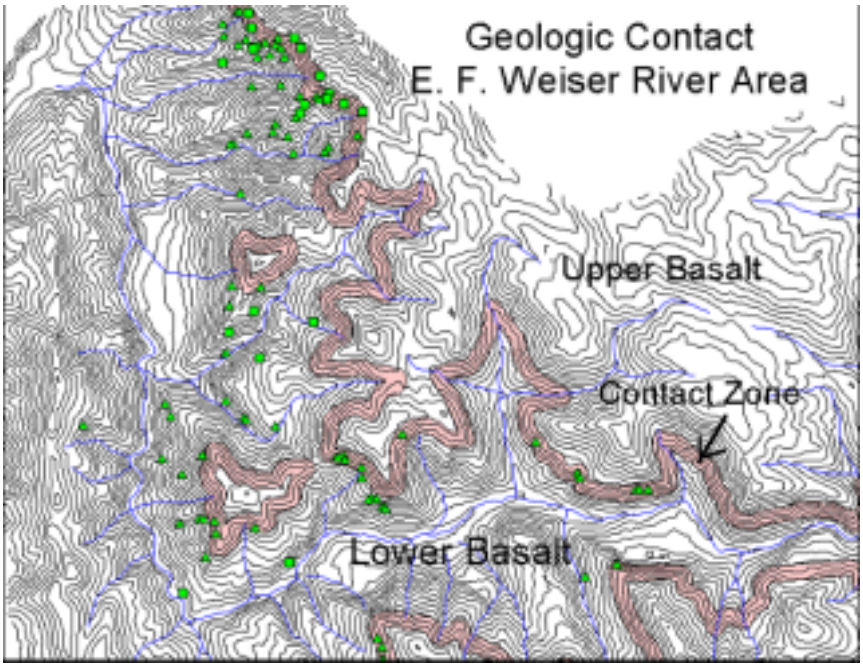

Figure 3. Contour map of the Upper Weiser River area showing geology and landslide locations.

Table 2 displays the landslide statistics for multicalibration regions.

Table 2. Upper Weiser Multicalibration Region Landslide Statistics

Geology	Area (km^2)	Percent of Area	Number of Landslides	Percent of Landslides	Landslide Density (per km^2)
Upper Basalt	37.2	52.1	1	1.0	0.03
Contact Zone	6.5	9.1	43	42.2	6.62
Lower Basalt	27.7	38.8	58	56.8	2.09

The SI values generated by SINMAP enable the user to reclassify the stability regions using spatial analysis. To simplify the results, we grouped the SI values into three zones of potential slope stability hazards: SI values > 1 were classified as having low to zero stability hazards; SI values between 1.0 and 0.7 were classified as having low to moderate stability hazards; and SI values < 0.7 were classified as having moderate to high stability hazards. The data in table 3 is based on this stability index grouping and displays the existing landslide densities in all three calibration regions combined in the analysis.

Table 3. Upper Weiser River SINMAP Reclassification Results

Landslide Potential	Area (km^2)	Number of Landslides	Landslide Density (number/km^2)
Moderate to High	3.7	53	14.3
Low to Moderate	11.4	42	3.7
None to Low	56.3	7	0.1

The three landslide potential categories generated a map (figure 4). Field crews were sent to verify or “ground truth” proposed timber harvest units and proposed road locations by using the map. The field verification for classifying landslide-prone areas was based on the following criteria:

1. Evidence of past landslides;
2. Soil characteristics for soil depth, rock fragments, and texture;
3. Ground slope;
4. Contributing drainage area and evidence of water; and
5. Vegetative rooting strength.

Feedback from the field crews was positive. Some landslides missed in the photo inventory were found, and all fell within areas mapped as moderate-to-high potential. Areas classified on the ground as landslide prone also fell within areas mapped as having a moderate-to-high potential.

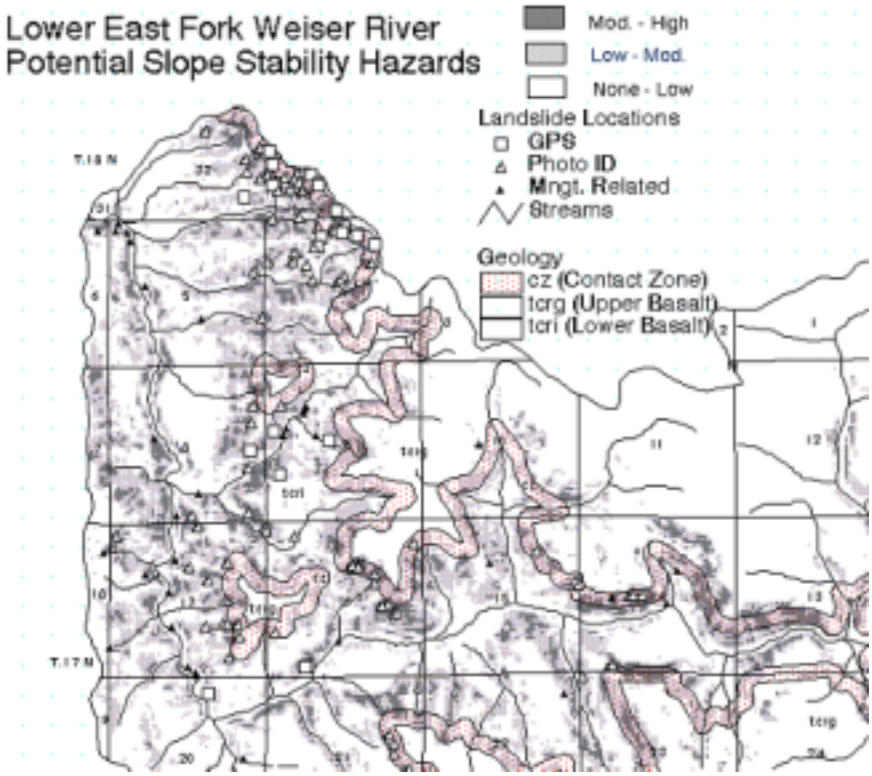

Figure 4. Map of Upper Weiser River area showing landslide potential categories

Conclusion

Since our initial testing of the SINMAP model, we have used the modeling procedure at various scales, including determining landslide hazards on 7.2 million acres in the Boise, Payette, and Sawtooth National Forests in support of a Forest Plan Revision. Additional analysis at the project level with SINMAP has been done on granitic, metamorphic, and basalt geologies. Calibration parameters varied by geology but were found to be transferable on similar geologic landforms using the same storm event. We have found the model relatively easy to use and flexible for a variety of situations.

Using the SINMAP model successfully requires accurate DEMs and a landslide inventory with accurate landslide initiation points in GIS. A detailed landslide inventory helps the modeler understand the processes that have effects on landslide potential. The detailed inventory helps the modeler adjust calibration parameters and develop calibration regions. The inventory is also valuable for field verification. Although SINMAP uses state-of-the-art GIS modeling techniques, computer modeling does not replace on-the-ground field investigation.

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USDI National Fish and Wildlife Service. 1998. Effects to Bull Trout from Continued Implementation of Land and Resource Management Plans as Amended by the Interim Strategy for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Western Montana, and Portions of Nevada (INFISH), and the Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH).

USDI National Marine Fisheries Service. 1995. Biological Opinion. Land and resource management plans for the Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests. U.S. Department of the Interior NMFS Northwest Region. (chinook salmon)

USDI National Marine Fisheries Service. 1998. Biological Opinion. Land and resource management plans for National Forests and Bureau of Land Management resource areas in the upper Columbia River Basin and Snake River Basin evolutionarily significant units. U.S. Department of the Interior NMFS Northwest Region (steelhead).

Rapid Mapping of Active Wildland Fires: Integrating Satellite Remote Sensing, GIS, and Internet Technologies

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Abstract

The U.S. Department of Agriculture (USDA) Forest Service Remote Sensing Applications Center (RSAC), in collaboration with the National Aeronautics and Space Administration (NASA)-Goddard Space Flight Center (GSFC) the University of Maryland, and the USDA Forest Service Fire Sciences Laboratory in Missoula, MT, acquires and processes Moderate Resolution Imaging Spectroradiometer (MODIS) data to produce active fire map and information products. MODIS imagery is processed to identify where fires have been detected and to produce active fire maps for the entire United States twice daily via the Internet along with further geospatial analysis and image processing to create associated fire information and image products. The MODIS active fire maps provide a daily synoptic view of the wildfire situation at the national and regional levels for interagency fire community use in strategic planning and for general public information.

Introduction

Annually, more than 135,000 wildland fire ignitions in the United States burn more than 4 million acres of land (National Interagency Fire Center 2002). If a wildland fire escalates to a large fire incident, the responsible Geographic Area Coordination Center (GACC) allocates appropriate firefighters, support personnel, and equipment. The National Interagency Fire Center (NIFC) National Multi-Agency Coordination (NMAC) group may also allocate fire suppression assets at the national level to a large incident. Regional and national use of remote sensing technologies to detect and monitor wildland fires is important for strategic planning. The finite number of traditional airborne and satellite remote sensing platforms such as Landsat, SPOT, AVHRR, and others, however, cannot continuously detect and monitor the numerous current and new wildland fires occurring daily throughout particular regions, or the entire country. Traditionally, airborne platforms are used to map fire activity at a large scale on a limited number of individual incidents for tactical purposes. Factors relating to temporal resolution, spectral resolution, or geolocational accuracy may further limit the application of the satellite remote sensing platforms in daily fire monitoring and mapping over large areas.

Since 2001 the USDA RSAC, NASA-GSFC, the University of Maryland, and the USDA Forest Service Missoula Fire Sciences Laboratory have collaborated to provide a synoptic view of active fire data and daily information from a

consistent sensor. The partners agreed to develop a rapid response fire-detection system and active fire-mapping process to provide daily active fire maps and associated image and information products for the entire United States via the Internet by using MODIS. The MODIS sensor, rapid response fire-detection system, and active fire-mapping process work together to provide daily geospatial products and information to the interagency fire community and the general public. The partners continue to improve the quality of the data products, increase the frequency of product delivery, and enhance access to the data products via the Internet.

Why Use MODIS for Active Wildfire Mapping?

Two recently launched NASA Earth Observing System (EOS) satellites–Terra and Aqua–carry the MODIS sensor. Terra was launched in December 1999 and Aqua was launched in May 2002. Terra, formerly known as AM-1, follows a sun-synchronous, descending polar orbit at an altitude of approximately 705 kilometers crossing the equator at 10:30 a.m. local time. Aqua, formerly known as EOS PM, is also on a sun-synchronous, polar orbit at the same altitude; however, it follows an ascending path, crossing the equator at 1:30 p.m. local time. The final Aqua engineering adjustments have been implemented now and its data can be fully utilized. The MODIS sensor is designed to map Earth's land, ocean, and atmospheric characteristics, with several unique characteristics that support daily wildfire detection and mapping.

Temporal Resolution. Both Terra and Aqua orbit the Earth approximately 14 times daily. Each MODIS sensor has a 2,330-kilometer (1,400-mile) view during a single pass that enables it to image any location twice daily in the mid to high latitudes, for one daytime and one nighttime pass. The location of the orbits, which move slightly from day to day, and the wide view, allow the contiguous 48 States to be imaged by a single MODIS sensor with 3 orbit passes (figures 1 and 2). The temporal offset of the orbits of the two satellites allows for fire monitoring throughout the day. For example, Terra's daytime and nighttime passes over the Central and Western United States are approximately 1,800 UTC (Coordinated Universal Time, or Greenwich Mean Time—GMT) and 500 UTC (2,300 MDT, Mountain Daylight Time), respectively. Aqua passes over the same area approximately 2 hours later. Daily fire monitoring is impractical with higher-resolution satellite sensors such as Landsat and SPOT, because they can image any location only every several days.

Figure 1. An example of a Terra MODIS orbit track over the United States. Daytime passes are in blue; nighttime passes are in red.

Figure 2. An example of a MODIS field of view.

Spectral/Spatial Resolution. MODIS has a broad spectral resolution with 36 coregistered bands covering 0.4 to 14.4 micrometers (visible to thermal infrared) collected at one of three spatial resolutions (250, 500, and 1,000 meters). The bands have a narrow spectral width and a radiometric resolution of 12 bits (4,096 brightness values). MODIS can maintain and recalibrate the proper sensor calibration by pointing the sensor at view objects of consistent radiances (e.g., the moon and deep space) (Justice et al. 2002). MODIS data is used according to the fire and thermal anomalies algorithm to detect fires (Giglio et al. 2000). The algorithm uses three of MODIS' 1-kilometer thermal bands (two at 4 micrometers and one at 11 micrometers) in conjunction with techniques to minimize the occurrence of false detections (Giglio et al. 2000). The higher saturation threshold of MODIS thermal

bands, compared to other sensors, enables the sensor to detect bright, hot fires both at night and in the daylight without being oversaturated by the brightness of the fire signature (Herring 1998).

Geolocation. MODIS offers superior geolocational accuracy to other moderate-resolution satellites. For example, errors in the AVHRR ephemeris can result in geolocation errors of several kilometers. Using the definitive ephemeris, constantly generated by GSFC and uploaded to Terra, minimizes MODIS geolocational errors. The unique onboard calibration process enables the MODIS sensor to crosscheck its geolocational accuracy against known physical Earth features that have been mapped at a very high level of accuracy (Wolfe et al. 2002). This process ensures +/-50-meter accuracy for Terra MODIS 1-kilometer bands. In other words, the positional accuracy of the center of the 1-kilometer pixel is within 50 meters in any direction.

Rapid Response System. Free downloading of MODIS data and MODIS-derived products is available 2 to 3 weeks after data acquisition from the U.S. Geological Survey (USGS) Earth Resources Observation Systems (EROS) Distributed Active Archive Center (DAAC). The Rapid Response System developed by RSAC, GSFC, the University of Maryland, and the Missoula Fire Sciences Laboratory acquires and processes MODIS data in real time and further processes data for mapping and monitoring wildfires. Worldwide MODIS data is transferred to the Tracking and Data Relay Satellite System (TDRSS) network and relayed to the EOS Data and Operations System (EDOS) in White Sands, NM, and then forwarded to GSFC in Greenbelt, MD, within 4 to 6 hours. In addition, a MODIS direct broadcast receiving station installed and managed by RSAC in Salt Lake City, UT, receives data for the western two-thirds of the United States in real time as the sensor passes overhead and disseminates the data to national forests and other field units within a few hours of acquisition. Once the MODIS data is acquired at both locations, it is automatically atmospherically corrected, calibrated, and georeferenced, and further processed for fire detections within 1 hour. Each fire detection contains the latitude/longitude centroid coordinates of the 1-kilometer cell, UTC time of detection, and detected brightness temperature, and is output into a raw, fixed-text file format for continued data processing. Several factors can limit the fire-detection capabilities of MODIS: (1) MODIS thermal bands cannot detect fires through heavy cloud cover; (2) to be detected, a fire must be at least 100 square meters in size, burning at 1,500 degrees Fahrenheit at the moment MODIS passes overhead; and (3) fires occurring on particular types of terrain may be obscured from MODIS' view (e.g., on steep slopes or in narrow canyons).

MODIS Wildfire Maps and Related Products

Raw fire detection data from RSAC and GSFC are continually compiled at RSAC in Salt Lake City and automatically processed into ArcInfo Geographic Information System (GIS) coverages for mapping and analysis twice daily (3:00 a.m. and 3:00 p.m. Mountain Daylight Time). The processed MODIS fire-detection data are used to automatically produce poster-size active fire maps covering each of the 11 interagency-designated geographic areas throughout the country, in addition to 2 smaller-scale maps produced for the Western and Eastern United States. Maps are produced at the prescribed times to ensure availability to the interagency wildfire community for

strategic planning at the beginning and end of each day, as well as for disseminating timely general public information. The maps are produced in a variety of formats (.jpeg, pdf, and HP-RTL) and are posted on RSAC's Rapid Response Web page (www.fs.fed.us/eng/rsac/fire_maps.html). Maps for the current day and archived maps for the current calendar year are also accessible.

Each active fire map displays active fire detections within the last 24 hours of the specified time and date on the map, as well as the cumulative detections from January 1st of the current year. The maps are rendered on a shaded relief base with other geospatial data for reference, such as political boundaries, cities, roads, and hydrographic features (figures 3 and 4).

Twice daily, RSAC's Rapid Response Web page provides reports of additional GIS analysis of current MODIS detection data detections and other spatial data for detailed geospatial information. The reports list all fire detections for the last 24-hour period with their latitude/longitude coordinate, time, and date of detection, and intersections of national forests, counties, States, and nearest towns.

Daily MODIS image data is also available from the Rapid Response Web site. MODIS "Quick-Looks"—true-color .jpegs of MODIS imagery with fire detections collected at the RSAC's direct broadcast receiving station—are available at varying resolutions for each daytime MODIS pass over the Central and Western United States. MODIS data for selected current large fires are processed daily and presented as true-color and false-color composite .jpeg images. These images portray the current burn extent, active fire areas, and smoke plumes for the duration of the fire.

Figure 3. An example of a MODIS active fire map for the Southwestern Geographic Area.

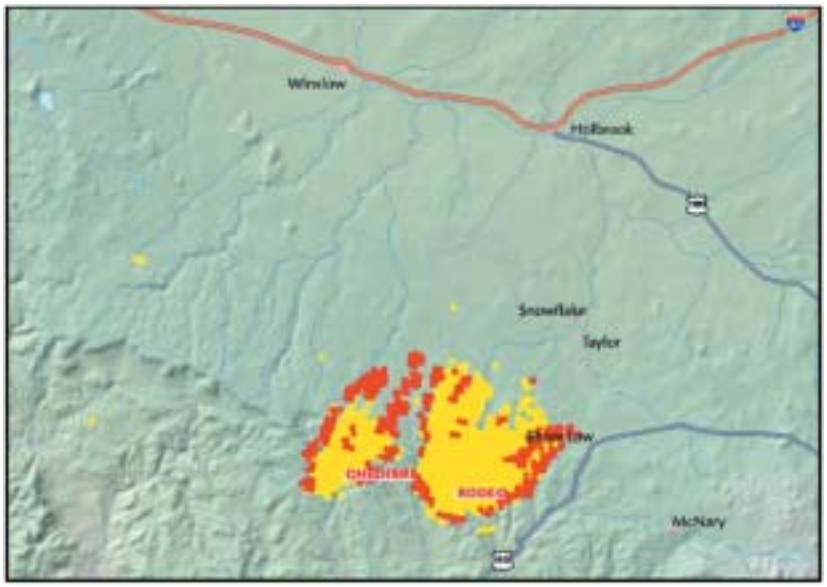

Figure 4. A subset of an active fire map. Red areas represent detections within the last 24 hours; yellow areas represent previous detections.

Summary

The design and development of the Rapid Response System for mapping and monitoring wildfires with MODIS are a result of a collaborative effort by the USDA Forest Service Remote Sensing Application Center, NASA-Goddard Space Flight Center, the University of Maryland, and the USDA Forest Service Missoula Fire Sciences Laboratory. The process provides an automated, rapid, and reliable approach for (1) daily acquisition and processing of remotely sensed data for active fire detections; (2) processing, analysis, and mapping of active fire detection data, and the production of other related products; and (3) distributing wildfire mapping products via the Internet. It is an excellent example of successfully integrating remote sensing, GIS, and Internet technologies. The MODIS active fire maps will serve the interagency fire community for strategic planning and provide information for the general public.

Planned future enhancements for the Rapid Response System include (1) integrating Aqua MODIS data to provide an additional view of fire conditions approximately 2 to 3 hours after each Terra MODIS pass; (2) providing cartographic enhancements to current map products; (3) integrating MODIS fire detections and other geospatial data into an interactive Web map interface; and (4) providing additional wildfire geospatial products and information.

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Technology and Development Innovations Now on the Internet

Bert Lindler
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The results of 50 years of innovation by the USDA Forest Service's Technology and Development Program are now available on the Internet at the address: http://www.fs.fed.us/t-d.

The site (figure 1) displays electronic versions of hundreds of reports, newsletters, and Tech Tips prepared by the Missoula and San Dimas Technology and Development Centers and the USDA Forest Service's Washington Office Engineering staff. It also includes some materials that only exist online, such as the Trail Bridge Catalog that helps land managers and engineers select the appropriate type of trail bridge for a particular recreational setting.

Figure 1. The National Technology and Development Program's Internet site (http://www.fs.fed.us/t-d) has electronic versions of hundreds of reports, newsletters, and Tech Tips.

Because the site contains administrative documents prepared for the USDA Forest Service and its cooperators, users need a username and password to gain access. Due to their technical nature or very limited audience, some documents may not meet USDA Internet requirements for access to the general public. Users can request a password by sending an e-mail request to t-d@fs.fed.us.

USDA Forest Service employees do not have to supply a username and password when they are using the site at work. But they will have to provide such identification if they log on from a personal account.

A special Web address (http://www.fs.fed.us/eng/t-d.php) opens a page that lets visitors know how to send an e-mail request for a username and password (figure 2). Several cooperators have established links from their Web sites to ours using this intermediate page. Standard links to the site would not work well, because visitors would not know how to get a username and password.

Figure 2. This page (http://www.fs.fed.us/eng/t-d.php) lets visitors know how to request a username and password for the National Technology and Development Program's Internet site.

This site does not show up on the Google search engine, but it does allow the Technology and Development Program to share electronic materials with cooperators who do not have access to the USDA Forest Service's internal computer network. Although the site has only been available to users since late 2002, it is attracting 500 to 600 visitors a week.

If you have suggestions or questions about this site, please contact Bert Lindler at the Missoula Technology and Development Center, blindler@fs.fed.us or 406–329–3930.

Fish Passage in Alaska, Oregon, Washington, California, and a State Near You!

Richard W. Sowa
Director of Engineering
Pacific Northwest Region

Ken L. Horstmann
Regional Transportation Planner
Pacific Southwest Region

So what's the issue?

In Alaska, the Northwest, and California, fish passage and culvert design have been issues of concern for the USDA Forest Service for more than 30 years. If you are not managing for fish right now, you soon will be. As Bob Dylan wrote in a once-popular song (if you don't know who he is, ask your mom or dad), "The times they are a-changing!"

Over the years our understanding of fish passage has changed, and consequently, culvert design standards have changed as well. From designs that simply got water off the road surface and from one side of the road to the other, we have progressed to designs that reflect a more sophisticated understanding of the need to pass all life stages of fish.

As we developed a better understanding, our standards were re-evaluated. Changes in State and Federal law imposed a major influence. State laws in Oregon and Washington, for example, now require designs that allow for passage of all native and migratory fish and access to historic habitat. Washington law also requires passage of all life stages of fish. Federal law requires maintenance of habitat conditions to provide for species viability throughout the range and access to habitat via the National Forest Management Act (NFMA). The Clean Water Act (CWA) requires protection of beneficial uses, and the Endangered Species Act (ESA) requires protecting and recovering at-risk species. With the changes in Federal and State laws, changes in our old standard—passage for adult salmon—were inevitable; we needed to change our standards to provide for all species and for different life stages of fish as well.

As the issues and our understanding of the issues change, standards also have to change to remain effective. The issues we are facing in Alaska, Oregon, Washington, and California are moving your way. To paraphrase Paul Revere's memorable call across the countryside to his noble but content fellow citizens, "The fish are coming, the fish are coming!" (or something like that). Fish issues are coming soon to a town near you.

As we began to deal with the new laws and issues surrounding fish passage and culvert design, we quickly discovered a fundamental lack of information. We did not know how many culverts we had, and more importantly, we did

not know what life stages could successfully pass through our culverts. We also did not have an agreed-upon method for evaluating passage capacity. We did know which culverts blocked adult salmon, but we did not have a comprehensive database to store that information, which is disconcerting if you consider yourself a leader in natural resource management.

What Are The First Steps?

To save a lot of time and energy, we recommend that you start on this issue now before it runs over you. We want to share our trial by fire, as well as the reasonable logical process we developed to catch up to the issue.

First, we established a protocol, using an interdisciplinary (no, that isn't a bad word) process. To avoid reinventing the wheel, we looked around and discovered that Region 10 already had a protocol in place. We had fish biologists, hydrologists, and engineers review and modify that protocol to fit our region's needs. Because each member of the interdisciplinary team had some critical input into the process, it is a better protocol. A critical component was to make the protocol apply to more than Federal land exclusively. We coordinated with the Oregon and Washington departments of fish and wildlife. While not identical, our protocols enable us to share culvert information across jurisdictional lines successfully. We also had to ensure that ultimately we could determine culvert replacement priorities on a statewide scale. It would be illogical to remove barriers at the headwaters if the problem was in an estuary.

(To request a copy of the protocol, contact Dave Heller, Region 6 regional fisheries program manager, 503-808-2994; Jeff Uebel, fish habitat program manager, 503-808-2847; or Paul Anderson, acting Columbia River Basin fisheries coordinator, 503-808-2930.)

Second, we conducted the inventory. Here are two of a number of ways to conduct such an inventory:

In Region 6 we pilot tested the protocol on three national forests. Based on what we learned from the pilot tests, we set up an interdisciplinary field team to train forest personnel to do the inventory and to oversee the data collection. We wanted to ensure consistent inventory methods regionwide so we could compare data between forests. Through our deferred maintenance program, we funded 13 forests in fiscal year (FY) 2000 to do the field inventory work, and we funded the remaining 7 forests in FY 2001. Today our database is up and running, and soon we will have the capacity to evaluate culvert replacement needs statewide. We estimate that our cost for conducting the inventory and importing the data into the database was about $155 per culvert.

Region 10 has completed its inventory and Region 5 has contracted out an inventory for the four northern forests in the region.

Third, we analyzed the data collected.

In Region 6 over the last 2 years, we have inventoried approximately 4,200 culverts on fish-bearing streams and have done some preliminary interpretation of the data.

With 4,200 sites inventoried in FY 2000 and loaded into the database, we learned from the data that about 10 percent of fish passage culverts pass all life stages, 8 percent need further study, and 82 percent do not pass all life stages of fish as required by State and Federal law.

The inventory shows that habitat reduction is greatest for juveniles and resident fish and least for adult salmon. The effects of habitat reduction include population fragmentation, loss of spawning and rearing habitat, and loss of seasonal refuge habitat. Much of the habitat loss is in the upper reaches of stream systems.

Washington and Oregon State inventory results are similar to those found on national forests, with up to 80 percent of their pipes failing to pass some life stage of fish species.

What do we do now?

Recognize the size of the problem. National forest lands in Region 6 contain an estimated 6,000 problem culverts—State and county roads could have as many as 8,000 more. At an estimated cost of $125,000 per pipe for fulfilling National Environmental Policy Act (NEPA) provisions, and preconstruction and contract administration costs, it could cost the USDA Forest Service $750 million to provide passage for all life stages of fish.

Although changing protocols will substantially increase cost, that is not necessarily bad news, especially if the change is in a positive direction. Knowledge of this expensive estimated cost compels us to set and maintain priorities. Because we understand the issues better now, we know that we need to do things differently.

We hope that the sharing of our experiences will help other regions see the dark clouds (that look a lot like fish) on the horizon and start to do their own culvert inventories. We are willing to share the specifics of what we have learned.

The most significant awareness for us is that we have to manage this issue on a statewide scale. For the first time in our history, we have the tools to deal cross-jurisdictionally to solve critical natural resource issues. Tools such as PL 106-393 (payments to counties), the Oregon Watershed Enhancement Board (OWEB), Salmon Recovery Fish Board (SRFB), and other State salmon initiatives, in conjunction with authorities such as the Wyden amendment, can help revamp or replace the most important pipes first, regardless of land ownership.

We hope that this article will provide you with a better understanding of the fish passage issue coming to a forest near you. We are confident that it is a manageable issue, but it does take time and money to address. We urge you to spend some time planning a strategy for the fish passage issue before it becomes an urgent costly necessity.

2002 USDA Forest Service Engineer of the Year Awards

Congratulations to the following winners of the 2002 U.S. Department of Agriculture (USDA) Forest Service Engineer of the Year awards:

- Managerial Engineer Gwendolyn Nishida from the Regional Office, R-5.
- Technical Engineer Randy L. Warbington from the Regional Office, R-8.
- Engineering Technician William T. Messmer from the Wrangell Ranger District, Tongass National Forest, R-10, and for
- Engineering Applications, C. Kenneth Brewer from the Regional Office, R-1.

National Forest System (NFS) Associate Deputy Chief Gloria Manning (far left), Director of Engineering Vaughn Stokes (far right), and NFS Associate Deputy Chief Gail Kimbell (center) are pictured with the 2002 Engineers of the Year. Ken Brewer, Randy Warbington, Bill Messmer, and Gwen Nishida (left to right) proudly display their award plaques.

The winners, selected from a list of excellent candidates, were honored at the USDA 2002 Forest Service Engineer of the Year award luncheon held in the Secretary of Agriculture's Dining Room in Washington, DC, on April 7, 2003. USDA Forest Service Associate Chief Sally Collins, National Forest System (NFS) Associate Deputy Chief Gail Kimbell, and NFS Associate Deputy Chief Gloria Manning welcomed the winners and applauded their achievements. The winners' families also attended the ceremony. Director of Engineering Vaughn Stokes presented each winner with a special plaque and cash award, commending them for their outstanding contributions. A summary of the winners' accomplishments appears on the following pages.

Congratulations also are extended to the regional candidates for the 2002 Forest Service Engineer of the Year awards. The finalists in all categories include the following:

Managerial Engineering	Technical Engineering	Engineering Technician	Engineering Applications
Arlin Krogstad, R-1	Beverly Young, R-1	Ralph Braden, R-1	Steve Hall, R-3
Terry Wong, R-2	Phillip Fessler, R-2	Adam Casados, R-3	Ron Broderius, R-4
Nancy Taylor, R-3	Dennis Stuhr, R-3	Ron Lange, R-4	Ken Surface, R-5
Aaron Howe, R-4	Thomas Gillins, R-4	Richard Ashe, R-5	Bob Goetz, R-9
Craig Miller, R-6	John Strauber, R-5	Dan Suptich, R-6	
Raleigh Meadows, R-8	Sandra Wilson-Musser, R-6	Dave Armstrong, R-8	
Roger Pekuri, R-9	Michael Knutson, R-9	Russell Christensen, R-9	
Larry Dunham, R-10	Ed Gilliland, SDTDC		

Gwendolyn Nishida
2002 Managerial Engineer of the Year

Gwendolyn Nishida is an engineering management analyst on the Region 5 engineering staff in Vallejo, CA. She has established a reputation as a seasoned engineer who is an innovative proponent of using nontraditional outreach techniques to attract a diverse group of highly qualified, motivated individuals to strengthen the U.S. Department of Agriculture (USDA) Forest Service engineering program and to improve the quality of life through engineering excellence.

Region 5 presented Gwen with the Managerial Engineer of the Year award, after honoring her with an extra effort spot award in 2001, selecting her as the Regional Office "TOP" supporter in 2000, and awarding her a Certificate of Merit as regional infrastructure manager in 1998. The Tahoe National Forest recognized Gwen with an extra effort spot award in 2000.

From 1990 through 1999, while assistant forest engineer on the Angeles National Forest, Gwen conducted numerous outreach events at preschools, as well as elementary, middle, and high schools. She hosted outreach events for on-forest youth camps and for the Santa Monica Mountains Conservancy outreach events, even convincing her husband to don the Smokey Bear costume for the preschoolers. Recognition from the Angeles National Forest included a 1991 quality-step increase and a 1994 Certificate of Merit. In 1995, Gwen became the first recipient of the African American Employee of the Year award for the Angeles National Forest.

Gwen's long-term commitment to fostering career opportunities for students is chronicled in certificates of appreciation from Pomona High School (1999), Vineland Elementary School (1997), and Arrowview Middle School (1996 and 1997). Thank-you letters from the Mountain Education Program (1992) and the USDA Forest Service's Region 5 director of personnel management (1991), and a letter of appreciation from the Inner City Youth Institute, Pacific Northwest Region, in 1998 further document her dedication.

Current responsibilities for Gwen include program planning and decisionmaking for the Region 5 public use and facilities (PUF) leadership team. The team includes the directors of recreation and engineering, deputy director of recreation, assistant regional engineer, and budget program managers for both staffs. The two staffs manage approximately $150 million in appropriated and unappropriated funds.

In spring 2002, Gwen completed the A-76 competitive sourcing inventories for the PUF staff. Her keen interest and immersion in the process led to targeted training for greater responsibilities; she will lead the competitive sourcing effort for Region 5's recreation and engineering staffs and serve as

a regional team member to complete the fiscal year (FY) 2003 competitive sourcing study.

Gwen validated information for the 810 occupational classification series in the Avue electronic program for the region and the Washington Office (WO) Engineering staff. She employed Avue for classification and staffing needs, and encouraged forest engineers to use the tool by sharing her expertise.

In 2002, the Personnel Resources and Development Center of the U.S. Office of Personnel Management (OPM), selected Gwen as a subject matter expert (SME), knowledgeable and experienced with 1 or more of the 800 occupation classification series for 1 of 21 nationwide focus groups. The SMEs reviewed the tasks and competencies in which they had expertise, ensured that they were clearly written and adequately covered, and provided appropriate feedback.

Gwen also oversees engineering construction certification and training coordination for Region 5's engineering and recreation staffs. She continues to provide technical counsel to the national certification coordinator. Her customer service orientation is well suited to encouraging engineers to embrace the newly implemented electronic program. Gwen shares her technical expertise with engineers and recreation specialists from the office and the field, as well as with members of the region's natural resource management staff and staffers from the regional forester's office.

In another certification role, Gwen implements the new Department Regulation (DR) 5001-1. In 2000, the WO requested that Gwen and another regional engineering certification officer review the draft DR-5001. She has heightened awareness of these program changes in the region and worked closely with the regional acquisition management staff to finalize the USDA Forest Service supplemental directive for implementing the DR.

Also on the certification agenda is consideration for eliminating the USDA Forest Service buildings exam and replacing it with international residential code (IRC) certification. WO program managers chose Gwen to participate on a national team to evaluate the advantages and disadvantages of restructuring the certification program. The team will provide a recommendation to the regional engineers.

Gwen further exemplifies her commitment to a viable certification program by maintaining her own construction certification. Her designation as Contracting Officer's Representative (COR) on one of the research staff's construction projects helps her to keep up with breakthrough technology and construction techniques.

The Capital Investment Program (CIP) within Region 5, in which an interdisciplinary working panel reviews, advocates, and evaluates project proposals that meet National Environmental Policy Act (NEPA) regulations, is another critical regional project. Gwen volunteered substantial time and energy to evaluate project proposals on Region 5's behalf, which earned her an extra effort spot award in 2002.

As a member of the Region 5 recruitment team and a recognized resource for nationwide recruitment efforts, Gwen was nominated by the region to compete nationally as recruiter of the year 2002. Her excellent working relationship with the regional office human resource management (HRM) staff and with human resource specialists at the forest level for recruitment, relocation, and retention (3Rs) enables Gwen to convene and conduct evaluation panels for vacancies within the engineering and recreation staffs.

In 2000, Gwen convinced the regional staffing specialist to better use time, effort, and funding by advertising entry-level civil engineer vacancies in a regionwide announcement for four forests and the San Dimas Technology and Development Center (SDTDC). Of the 14 applicants, approximately 25 percent were ethnic minorities.

From 1994 to 1996, Gwen represented Region 5 on the Minority Engineering Program Industry Board at California Polytechnic Institute at Pomona. Gwen and her husband participated in many outreach and recruitment efforts, personally funding sponsorship of several students for an "Evening with Industry" and supporting a student scholarship.

In FY 2002, the American Society of Civil Engineers (ASCE) initiated a joint project with Region 5 to educate its membership in the greater Los Angeles area about work performed by civil engineers in the USDA Forest Service. As project coordinator, Gwen previewed career options for the ASCE membership and enhanced USDA Forest Service outreach capabilities. She worked with the forest engineer of the Angeles National Forest to present an overview of engineering in the Agency and to host a tour of noteworthy USDA Forest Service construction projects in the Los Angeles area.

Gwen is a leader in effectively applying old and new employment strategies. In 2000, she pioneered the use of the 3Rs bonuses and allowances to research and shepherd a number of staff requests through the approval process (earning her the 2000 "supporter of the year" award from forest engineers). By 2001, Gwen was working with Region 5 forests to employ the 3Rs. Also during 2001, Gwen resurrected the use of the "superior qualifications" appointment authority to hire individuals at above-entry-level status. Regions 3, 6, 8, and SDTDC (from which she received a Certificate of Merit in 2002), worked with Gwen to apply these techniques. Gwen also initiated work with a USDA Forest Service contractor to plan and arrange the 2002 student orientation while a newly assigned HRM staffer mastered his new responsibilities.

Gwen also seeks to nurture potential engineers by working through MentorNet, a nonprofit electronic industrial mentoring network for women in engineering and science. She mentored a young African American female civil engineering student studying at South Carolina State University.

Gwen's perceptive analysis and obvious commitment to student outreach programs persuaded the WO Student Educational Employment Program (SEEP) manager to reinterpret the guidelines to enhance program flexibility. Gwen personally provided bedding and assorted household items to students who rented unfurnished apartments. She loaned funds to one student for his first month's rent and paid an $800 security deposit for another student.

Her energetic efforts to value diversity in outreach and recruitment, as espoused by the regional engineer and the USDA Forest Service chief, are well known. She has fostered interest in USDA Forest Service employment from underrepresented communities through posting advertisements with minority-sponsored professional organizations and in local newspapers that effectively reach underrepresented populations.

Gwen has posted Demonstration Project (DEMO) advertisements electronically and in print through the Society of Hispanic Engineers (SHPE), the National Society of Black Engineers (NSBE), the National Association of Asian American Professionals (AAAP), the American Indian Science and Engineering Society (AISES), the American Institute of Architects (AIA), and the American Society of Civil Engineers (ASCE). She has also posted on Yahoo.com Job Board and JOBTRACK.com (a service that posts jobs online to more than 1,000 colleges and universities nationwide).

In 2001, the regional engineers established a national taskforce to develop a strategic plan for immediate and long-range recruitment and retention of engineers and related skills occupations. Gwen was appointed to the Engineering Workforce Strategy task force that worked in tandem with the National Recruitment Council. The task force-prepared draft was presented to the regional engineers in October 2001.

Also in 2001, Gwen discovered new regulations on the OPM Web site that would allow repayment of recruitment and retention incentives for student loans. She actively sought information to implement the new regulations from the Region 5 HRM director and the WO program specialist and touted its potential value. The implementation guidance, originally slated for FY 2003, was released in May 2002.

Gwen shared highlights of the Draft Engineering Workforce Strategy report with representatives of other agencies at the May 2002 meeting of the Professional Council of Federal Scientists and Engineers. At the meeting, Gwen learned of another potential recruitment tool, the Career Intern Program. In early summer of 2002, the USDA released the implementation guidelines. Gwen is working with the WO SEEP manager, through the region's HRM specialist, to pioneer the use of this new recruitment tool in the region.

Because of Gwen's efforts, Region 5 significantly advanced toward its workforce-hiring goal. She placed 12 of the 13 students requested by the regional forester for the engineering Student Cooperative Enployment Program (SCEP) and successfully placed a student in another unit. Three African American males, four nonminority males, one Hispanic male, one nonminority female, two Asian males, and one Asian female, as well as one nonengineering student and several African American males in wildlife biology became USDA forest Service employees. In 2002, Gwen also helped place, and subsequently converted, two engineering SCEPs—one from Region 1 to the Cleveland National Forest and one from Region 6 to SDTDC.

To overcome the hurdle of providing housing during the summer months for students in the SCEP and STEP, as identified by the forests, Gwen personally contacted apartment managers, hotels, and temporary housing agencies, and secured housing for students on a number of units. She

worked with the regional purchasing agent to ensure that rents were paid. Gwen negotiated to meet housing or quarters requirements with quarters program managers to include the apartments in the quarters system, and facilitated quarters deductions from student paychecks by preparing SF-52s for the supervisors to submit to HRM. She expended extra effort on these forest responsibilities to enhance the success of the student employment programs.

Gwen's community service mirrors her dedicated Agency service. As a former member of a church building committee, she advised the church elders on proposed building projects. She and her husband worked with architects, engineering professionals, and city building officials on behalf of the church.

Gwen is also an advocate for community safety, especially for the neighborhood children. She serves as block captain for the community neighborhood watch and edits the quarterly newsletter, the Montevino Grapevine, in her housing development.

An avid collector of dolls, toys, and children's books, Gwen has more than 4,000 dolls and approximately 3,000 children's books. In 1997, she and her husband purchased and still own a commercial building that serves as their church's youth center and now accommodates another local minister for Bible studies and prayer meetings.

Gwen put her children's books to work in the "City of Readers" program for the City of San Bernardino. In one large room of the Nishidas' commercial building, she started and maintained a reading club for children ages 3 to 12 until accepting her Region 5 position in November 1999. She wrote a quarterly newsletter, the Bookmarkers, to publicize the club.

During the 1996 school year, Gwen volunteered for the School Site Council at her son's school, Arrowview Middle School. The council, which consisted of parents, interested community members, faculty, and student leaders, evaluated and selected proposals for spending special State funding allocations. Gwen supported proposals to expand the program for purchasing student computers and improved security for the computer lab. She continued her council work even after her son's graduation from Arrowview in 1998 by helping to review the school's effectiveness in teaching bilingual education. She was honored by the City Unified School District for her contributions to the council.

Gwen eagerly pursues professional development. She enrolled in evening classes to familiarize herself with personal computers when the Agency mandated their use. She avidly pursues inservice training and has completed 2 years of a 3-year USDA Graduate School certificate of accomplishment program for management analysis.

Gwen Nishida is dedicated to encouraging a diverse group of students, young adults, and professionals in a variety of fields to develop their full potential as engineering professionals. In her service to the community, in her professional affiliations, and in her USDA Forest Service responsibilities, she is a champion of the tangible contributions that the engineering profession contributes to the quality of life.

Randy L. Warbington
2002 Technical Engineer of the Year

Randy L. Warbington is the facilities engineering program manager for Region 8 in Atlanta, GA. Throughout his career Randy has strived to incorporate new ideas and concepts into his work by constantly searching for and implementing better, more practical solutions to facilities issues through industry technical papers, college and university training, and hands-on experience.

Randy's interest in construction began early, working with his father, a drywall contractor, at every opportunity. While participating in a variety of family projects, he constructed several houses, including his current residence, before, during, and after attending Abraham Baldwin Agricultural College. After graduating with an associate's degree in forest technology, he studied engineering for a year at Georgia Southern College, worked as a surveyor and engineering technician for several consulting engineering firms, and later worked for a county water and sewer department. Randy married and successfully pursued a 1979 University of Georgia (UGA) Bachelor of Science (BS) degree in forest resources. He began his USDA Forest Service career in 1978 as a summer student on the Chattahoochee-Oconee National Forests. After graduating, Randy worked for 3 months as an intern forester with the International Paper Company. He enrolled in the engineering program at UGA, completing his academic work and serving as a USDA Forest Service engineering coop student. Upon receiving his 1981 BS in agricultural engineering, he returned to the Chattahoochee-Oconee National Forests full time. Randy progressed from a trainee to a professional level while working in a variety of jobs there, including stints in roads (preconstruction, construction, and transportation planning) and facilities. In 1987, Randy became an Atlanta Regional Office staff engineer responsible for heating, ventilation, and air conditioning (HVAC) and electrical design. In 1990, he earned a license to practice civil/sanitary/structural engineering in the State of Georgia. Randy has worked in the facilities arena in Atlanta ever since, serving as unit leader for infrastructure design and managing the facilities, environmental, bridge, and construction certification programs from 1996 until becoming facilities program manager in 1999.

He has received numerous awards throughout his career, including Superior Performance Awards for the years 1989, 1991, 1992, 1993, 1994, 1996, 1997, 1998, 1999, 2000, 2001, and 2002.

While on the Chattahoochee-Oconee National Forests, Randy partnered with coworker Dan McReynolds to create a set of automated field design and data collection programs for laying out and staking timber haul roads in mountainous terrain. Several of the Region 8 Appalachian forests ran these

HP-41CV programs for about 10 years. Randy and Dan wrote a 1987 *Engineering Field Notes* article describing this system, which was showcased at the Ithaca, NY, 4th International Low Volume Roads Conference.

Over the past decade Randy has designed many innovative and complex HVAC systems in various USDA Forest Service buildings. His HVAC systems include the following: hydronic radiant floor and infrared radiant heating systems; indirect evaporative cooling, under-slab forced air distribution, and heat-exchanger ventilation systems; welding shop ventilation, commercial kitchens with compensating hoods, laboratory ventilation systems, carpenter shop dust collection systems, and direct gas-fired makeup air systems for a Job Corps paint shop; condensing and modulating gas-fired boilers, energy-efficient chillers, advanced "glazing systems," "suntracker"-controlled lighting, and radiant barriers; dehumidification, building moisture control, HVAC and halon systems for protecting sensitive documents; and NFPA 13, 13R, and 13D fire-suppression systems. Few USDA Forest Service engineers have implemented this many on-the-ground applications of practical technology for a safer, more sustaining, and more comfortable work environment.

Randy also leads the Agency in the practical application of ground-coupled heat pump systems. Since his first ground-coupled system installation in 1990 for the Daniel Boone National Forest, Morehead Ranger District (RD) office, he has designed systems for the Ouachita National Forest, Choctaw RD office; the Chattahoochee-Oconee National Forests, Oconee RD office; and the Davy Crockett RD office in Texas. He championed the technology throughout the Southern Region and wrote a 1993 *Engineering Field Notes* article describing Region 8's experiences with the ground-coupled systems. A dozen of those systems are currently in place or under construction throughout the USDA Forest Service national forests.

In addition to working in HVAC and mechanical engineering, Randy has designed a wide variety of electrical systems: single- and three-phase services with up to 1,200-amp emergency and standby generator systems; uninterruptible power supply systems; transient protection and lighting protection systems; "advanced" grounding electrode systems; elevators, static and rotary phase converters, and power factor correction capacitors; fire alarms and detection and security systems; and sewage lift stations.

Agency facilities that Randy designed include many full-service campground water and electrical systems located in the Southeast; an Olympic-sized, zero-depth entry swimming pool; and several onsite sewage treatment systems (drain fields and sand filters). Currently, he is working on air tanker bases, heliports, and other facilities in support of the fire program, including vertical-volume recovery systems for detention and treatment of storm water in areas of the country with sandy soils and high water tables.

Randy's peers, supervisors, and national program managers consistently consult him for advice and counsel for his knowledge and common sense approach to difficult and complex issues. For example, to improve the skills and credibility of the USDA Forest Service workforce servicewide, Randy works to develop and enhance construction certification and encourage the professional registration of engineers.

Since 1990, coworkers Bill Speer and Ron Stanley, have collaborated with Randy to prepare and maintain the buildings certification exam. Randy is leading the effort to adopt some components of the International Code Council (ICC) to further improve the training and competence of USDA Forest Service building inspectors.

As an advocate of the professional registration of engineers, Randy wrote a draft of Forest Service Manual (FSM) 7100, a comprehensive document of issues related to professional registration for Agency engineers. He is a team member for a national initiative to refine the proposal before making final recommendations to the regional engineer for Region 8.

Since becoming the program manager for facilities in the Southern Region, Randy has used an interdisciplinary team to formulate a 5-year construction program using the "Choosing by Advantages" methodology. Each year he leads a number of Choosing by Advantages sessions for both the National Forest System and research staffs. His efforts have made this decisionmaking methodology a household word throughout the Agency.

In terms of overall project dollars, Randy plans and oversees the largest and most diverse facilities program in the Agency. He has increased the use of architectural/engineering (A&E) contracting and promoted design-build methods in an effort to "Do More—Better—With Less." These contract techniques have migrated to the forest level, where using design-build methods is becoming more accepted and better understood, thus yielding more for the dollar, on the ground. His advice and counsel is sought after on A&E-related issues, such as the master plan for Mississippi's Okhissa Lake Project.

Randy is the driving force in the vision, negotiation, development, and actual construction of the Southern Region air tanker base program. He has initiated work with airport authorities in Chattanooga, TN; Fayetteville, AR; and Lake City, FL, to build three additional bases. As the contact for all associated staff areas, including procurement and fire, he and the national air tanker base coordinator work together to ensure that the program is proceeding smoothly and on schedule.

While serving as unit leader, Randy created a "Customer Service and Teamwork" performance element for unit employees. He edited the R8 Architecture and Engineering Services Guide, the source for basic specifications for in-house work and for Region 8's multidisciplinary A&E service contracts, which have been in use for the past 10 years.

In 1999, as dean of the very successful Eastern/Southern Region University, Randy added engineering-related courses to the curriculum and increased the level of program participation. He has initiated many external training sessions for Region 8 employees, primarily related to building science and codes, and created and taught several sessions of "Electrical Design and Construction" for the Agency. The course workbook is still used throughout the region. Randy also wrote the Region 8 FSM Supplement 7600 Electrical Engineering and was active on a committee to develop this document into FSM 7600, the Agency policy and direction for electrical engineering.

Over the years Randy has always jumped at the chance for professional development. He has been a member of the National Association of Civil Engineers for a number of years, and in October 2002 became ICC-certified as a residential building inspector, completing exams in building, electrical, plumbing, and mechanical inspection. Randy has been certified in most of the USDA Forest Service construction contract administration and technical categories.

Randy and his wife, a special education teacher at Canton Elementary School, have two teenage daughters at Cherokee High School. Randy has worked in the local Community Club as treasurer for 2 years and as a youth basketball coach for 5 years. He is a longtime member of the Mt. Zion Baptist Church orchestra, where he plays piano, keyboard, guitar, and banjo. Randy continues to enjoy church projects such as rehabilitating small church facilities in upstate New York.

Randy L. Warbington has excelled throughout his career in adapting, developing, and engineering better applications for safer, more sustainable, more comfortable facilities by applying knowledge derived from industry technical papers, college and university training, and hands-on experience. Coworkers and peers within the USDA Forest Service, associates in other agencies, professionals in the private sector, and individuals in his community recognize his dedication to seeking and ensuring high-quality workmanship.

William T. Messmer
Engineering Technician of the Year

William T. Messmer is the head of the Wrangell Ranger District staff, Tongass National Forest, in Wrangell, AK, in Region 10. Bill is an acknowledged technical expert with outstanding contributions in road design, contract preparation, and roads management.

Throughout his career, Bill has developed, applied, and shared new technological ideas and concepts. Often he has been selected to lead certification panels and participate in special roads committees to develop regional standards and to review and recommend processes and approaches for implementing road construction and maintenance strategies in Region 10.

His extensive field investigations on beaver behavior and habitat preferences have established Bill as a recognized expert on beaver control structures for culverts on the Wrangell Ranger District and as the only Tongass employee to receive the Beaver Eradication Award. Bill shares his accomplishments and challenges with his coworkers on the forest level. He has incorporated data from his extensive field investigations in designing devices to control and minimize damage to roads.

Bill was instrumental in developing hourly equipment rental performance contracts to foster increased production and lower costs for road maintenance. The contracts are now in use for all districts in the Tongass National Forest. These flexible contracts cover a host of maintenance needs and have saved the Government substantial funds over the years.

Sustained, exceptional engineering support for the USDA Forest Service's ecosystem and resource management distinguishes Bill's nearly 30 years of work as an engineering representative on timber sales (TS), often on several districts at the same time. He is a master performer, managing whatever contract is required to implement district work. Resource specialists value his extensive background, insight, and counsel for engineering concerns and arenas well beyond the engineering program. He has mentored many young engineers and technicians, teaching them how to locate, design, and build roads that meet all resource needs. His commitment carries over to work with facilities, trails, and numerous other activities that are reflected in the best-managed district engineering program of the Tongass National Forest.

On several TS development projects, Bill was selected as the interdisciplinary team (IDT) leader for his ability to work well with many different disciplines and individuals with contrary opinions and to resolve difficult issues

quickly. His awareness of roles and responsibilities at all levels of the organization and his wide range of skills, open-minded approach, and excellent communication skills make him an effective group leader. Bill has mentored, advised, and assisted numerous people throughout his career in his role as an equal employment opportunity (EEO) counselor and civil rights representative on the forest's Civil Rights Action Group.

Although most of Bill's career has been at the district level, his ability and credibility as an engineering professional enable him to relate well at all levels of the organization. He has contributed significantly to the cross-pollination of ideas for improved processes and project results regionwide. His contributions in road design, contract preparation, and roads management are displayed in the work of the many engineers and technicians he has trained and in the condition of the roads and facilities on the Wrangell Ranger District, which are second to none.

Bill has a solid record of outstanding community service through public office, committee memberships, and plain hard work. He received a Distinguished Service Award for being an outstanding school board member from the Wrangell Board of Education and was named Member of the Year by the Wrangell School Board for 1996. For 8 years, from 1988 to 1999, he was president of the Wrangell School Board. He also received the State Superintendent's Award from the Alaska School Board.

Bill also served on the Wrangell Planning and Zoning Commission from 1978 to 1980; lobbied for the city as a member and past chairman of the Wrangell Legislative Liaison Committee through 2000, as well as mentoring new members; and completed a term on the Wrangell City Council from 1999 to 2000. His affiliations include membership in the Island of Faith Lutheran Church and envoy membership in the Xi Phi Chapter of Beta Sigma Phi.

To meet his social needs and those of his community, he has been a member of the Benevolent and Protective Order of the Elks #1595 since 1978—on the steak committee as cook for 22 years, as chaplain for 5 years, and currently as a trustee. (He was named Elk of the Year in 1986.) Bill is a charter member of the Wrangell Gold Club and member of the tournament committee. In cooperation with the Wrangell Chamber of Commerce, he has chaired the Fourth of July Logging Show, announced logging events for many years, and sold tickets for the Fourth of July Royalty Committee. He also serves on the Stikine Sportsmen board of directors.

William T. Messmer's contributions in road design, contract preparation, and roads management; his ability to share those concepts and practical applications; and his willingness to work long and diligently to serve others have earned the respect of his coworkers and peers within the USDA Forest Service, with other agencies, in the private sector, and within his local community.

C. Kenneth Brewer
2002 Engineering Applications Employee of the Year

C. Kenneth Brewer is a remote sensing specialist with the regiona1 engineering geospatial group in Missoula, MT. For more than 2 decades, Ken has amassed a long list of awards from the USDA Forest Service, other agencies, and outside groups for remote sensing and ecological modeling applications to support ecosystem and resource management and implementation.

From the USDA Forest Service, Ken received special recognition from the regional forester in 1988 and from individual ranger districts (RDs) in 1990, 1991, and 1994. USDA presented Certificates of Merit and cash awards to Ken in 1986, 1987, 1989, 1996, and 1997 for contributions to the Interior Columbia Basin Ecosystem Management Project, the regional strategic planning strategy, integrated resource and National Environmental Policy Act (NEPA) analysis, and analysis of timber stand data and mountain pine beetle mortality modeling. In addition, he was honored by the University of Montana in 2000 with the President's Award of the Bertha Morton Fellowship, by the Society of American Foresters in 1994 for Outstanding Service to the Society, by the Montana Society of American Foresters as Forester of the Year in 1991 and 1993, and with the First Line Supervisors Safety Award, Tally Lake RD, in 1987.

Through conference presentations, regional training programs, technology transfer service visits, and published documents, Ken shares concepts for remote sensing and ecological modeling applications to support ecosystem and resource management and implementation. He has pioneered in implementing and concept proofing of E-cognition software, which is currently being used in Region 1's vegetation mapping, R1-VMP. R1-VMP uses E-cognition software for the image segmentation of Landsat 7 TM imagery.

Ken also handles technical applications support for ecosystem and resource management for the USDA Forest Service. He chaired the Vegetation Council in 2001 and participated in the Inventory and Monitoring Working Group and Ecosystem Management Core Team for the Northern Region in 1998. He also supported teams for the FS 2090 Manual and Handbook revisions in 2002, for National Remote Sensing in 1998, and for the Interior Columbia Basin Ecosystem Management Project in 1996. Currently, he is involved with vegetation mapping for the western Montana and northern Idaho portion of the Northern Region.

Ken has consistently used an interdisciplinary approach regionwide by involving silviculturists, ecologists, wildlife biologists, and soil scientists in project design and development to accomplish the Agency's mission effectively. He is well known for his guidance in developing, writing, and promoting consistency on the National Vegetation Classification and Mapping protocol development team and in resolving longstanding vegetation classification issues through his leadership of the Northern Region Vegetation Council.

Ken's community also has benefited from his dedication. For many years he has been involved with volunteer fire departments, both as a member and as a trustee,. He has been a member and president of his local church board, has coached youth soccer teams and is a certified referee for youth and interscholastic programs; and has served as a resource advisor for the Flathead Land Trust.

To support international development programs, Ken volunteered in 1992 as an agro-forestry/land reclamation advisor for the Future Forest Foundation in Honduras, Central America. In 1994 he provided silviculture and genetics instruction for the Department of Forestry in Belize, Central America.

Ken is active in a variety of professional groups, such as the Society of American Foresters, where he has served as the Montana Society Science and Technology Committee Chair, as the Flathead Chapter Chair, and as a member of the Montana Society Executive Committee. Other memberships include the National Forest Ecology Working Group; the National Remote Sensing Working Group; the American Society of Photogrammetric & Remote Sensing; the Ecological Society of America; and the American Water Resources Association.

Ken has kept his skills up to date through continuing education. He earned a Masters degree in 1989 and has nearly completed his Ph.D. on his own time, while working full time for the Agency. He also serves as an adjunct faculty member for the Boise State University Graduate School. As a peer-reviewer for Springer-Verlag publishing and for Photogrammetric Engineering and Remote Sensing (the journal of the American Society of Photogrammetric & Remote Sensing), Ken continues to assimilate state-of-the-art concepts and apply new technology in his own career.

Ken has written or coauthored many articles for technical journals and peer-reviewed publications, such as those listed below, to share the concepts, development, and applications of new technology.

Brewer, K., D. Berglund, C. Jacobson, and J. Barber. 2002. "Northern Region Vegetation Mapping Project." In Proceedings of the Ninth Forest Service Remote Sensing Conference. Edited by Jerry Dean Greer. American Society of Photogrammetry & Remote Sensing.

Gmelin, M., and K. Brewer. 2002. "Operational Change Detection-Based Fire Severity Mapping Using Landsat TM+ Data." In Proceedings of the Ninth Forest Service Remote Sensing Conference. Edited by Jerry Dean Greer. American Society of Photogrammetry & Remote Sensing.

Brewer, K., C. Winne, R. Redmond, D. Opitz, and M. Mangrich. In review. "Classifying and Mapping Wildfire Severity: A Comparison of Methods." Photogrammetric Engineering and Remote Sensing.

Brewer, K. 2002. (July/August) "Plowing Through the Challenges of Technology Transfer." Imaging Notes: The World's Guide to Commercial Remote Sensing. 17(4): 22.

Jensen, M.E., I. Goodman, N.L. Poff,. P.S. Bourgeron, and C.K. Brewer. 2001. (October) "Effectiveness of Biophysical Environment Criteria in the Hierarchical Classification of Drainage Basins." Journal of the American Water Resources Association. 37(5): 1155-1167.

Coppin, P., K. Nackaerts, L. Queen, and K. Brewer. 2001. "Operational Monitoring of Green Biomass Change for Forest Management." Photogrammetric Engineering and Remote Sensing. 67(5): 603-612.

Jensen, M.E., and P.S. Bourgeron, tech. eds. 2001. "Ecological Classification and Mapping of Aquatic Systems." In A Guidebook for Integrated Ecological Assessments. New York: Springer-Verlag.

Gmelin, M., and K. Brewer. 2001. "Mapping Fire Severity and Redelineating Timber Stands on the Bitterroot National Forest Following the Fires of 2000." In Proceedings of the USDA Forest Service Geospatial Conference. USDA Forest Service Electronic Publication.

Brewer, D., K. Brewer, and L. Queen. 2000. "Monitoring Change in Forest Ecosystems: Satellite Remote Sensing or Aerial Detection Surveys and Stand Records." In Remote Sensing and Geospatial Technologies for the New Millennium; Proceedings of the Eighth Forest Service Remote Sensing Conference. Edited by Jerry Dean Greer. American Society of Photogrammetry & Remote Sensing.

USDA Forest Service Advisory Team. 1999. "Implementation of Remote Sensing for Ecosystem Management." USDA Forest Service Remote Sensing Applications Center. EM-7140-28.

Brewer, K. 1999. Taxonomic Classification Logic and Rules for Forest Vegetation of the Northern Region. Northern Region Electronic Publication.

Jones, J., K. Brewer, G. Enstrom, and J. Caratti. 1998. Documentation of the Modeling of Potential Vegetation Settings and Vegetation Response Units Using Topographic Variables. Northern Region Electronic Publication.

Jensen, M., I. Goodman, K. Brewer, T. Frost, G. Ford, and J. Nesser. 1997. "Biophysical Environments of the Basin in an Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins." General Technical Report PNW-GTR405.

Quigley, T.M., R.W. Haynes, and R.T. Graham, tech. eds. 1996. "Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins." General Technical Report PNW-GTR382.

Science Integration Team. 1994. Scientific Framework for Ecosystem Management in the Interior Columbia River Basin. Interior Columbia Basin Ecosystem Management Project.

Brewer, K., and P. Callahan. In review. “Interior Columbia Basin Watershed Delineation Guidelines.” General Technical Report PNW-GTR000.

Kenneth Brewer’s professionalism, commitment, attention to detail, and leadership in conceptualizing and developing workable solutions to the application of remote sensing and ecological modeling technology have earned the respect of his coworkers and peers within the USDA Forest Service, with other agencies, and throughout the private sector.

2002 USDA Forest Service Engineering Special Recognition Award

In addition to the annual USDA Forest Service Engineer of the Year awards, for exemplary performance an unprecedented USDA Forest Service Engineering Special Recognition Award was presented to Raleigh Meadows by Washington Office Director of Engineering Vaughn Stokes on April 24, 2003, in Hot Springs, AR.

Raleigh, who is the forest engineer and lands team leader for the Ouachita National Forest, Region 8, in Hot Springs, AR, was recognized for his significant contributions to the USDA Forest Service engineering program during his 41 years in public service. According to the USDA Forest Service Regional Director of Engineering for Region 8, George Kulick, "Raleigh is in a class by himself, in terms of the knowledge, wisdom, and wealth of experience that he brings to the job."

Raleigh first worked as a USDA Forest Service employee in 1961 on the Cherokee National Forest in Tennessee. There he was responsible for constructing the Jacobs Creek Job Corps Center. He moved to Alabama to become a forest engineer in 1969. In 1972, he began his work with the Ouachita National Forest in Arkansas. Raleigh has the distinction of serving as a forest engineer longer than anyone in the history of the USDA Forest Service—33 years. He also holds the longest tenure as a forest engineer on the same forest. He has worked for 10 forest supervisors and has collaborated with 9 of the 11 Region 8 forest engineers.

With a career in the USDA Forest Service spanning 5 decades, Raleigh has witnessed a world of change in the engineering field. The slide rule used by engineers during the beginning of his career has been replaced by technology such as global positioning, electronic distance meters, and computer-aided design (CADD). Raleigh not only adapted to these technological advances but led the Ouachita team in developing a technologically advanced system of water treatment using a mixed-oxidant disinfection system as well as a process for using solar power in a remote recreation area.

Since working at the Ouachita National Forest, Raleigh has overseen the construction of more than 2,000 miles of road within the forest. He established the purchaser credit program, which centralizes the maintenance of more than 5,500 miles of road within the Ouachita National Forest. He oversees the maintenance of more than 400 buildings, 20 dams, and 10 water systems. He also manages one of the largest land exchange programs in the region, as well as the only commercial quartz-mining program.

He is currently working with a rural development commission to restore a historic former Girl Scout camp constructed by the Works Progress Administration during the Great Depression.

Raleigh managed the initial response, investigation, and cleanup after a record flood and major ice storm. One of his engineers received the Secretary of Agriculture Honor Award for his quick action in getting the forest roads open following the storm.

Raleigh has also managed atypical projects such as the acquisition, development, and exchange of a residential Young Adult Conservation Corps (YACC) camp. He has overseen the completion of two Intermodal Surface Transport Efficiency Act (ISTEA) projects by coordinating with the U.S. Department of Transportation's Federal Highway Administration and the State Highway Department. He worked with local water utilities to connect three major recreation areas to city water to ensure them safe and adequate drinking water, while reducing overall long-term maintenance costs to the forest.

Achievements in the USDA Forest Service have not stopped Raleigh from making contributions to the local community. He has been active in a family business that finds jobs for the local unemployed and for many years has coached baseball at the local Boys Club. He and his wife of 41 years have three grown children.

"Raleigh has been innovative and has adjusted with the times, yet has maintained his philosophy of honesty, sound engineering, and giving full support to the workers he manages," said Kulick. "He is an invaluable part of the Ouachita, the largest national forest in the region."

Engineering Bulletin Board

Sharing Noteworthy Information

Washington Office (WO) Engineering and its detached units comprise a dynamic organization in which engineers frequently broaden their expertise by taking on new responsibilities. Accommodating rapidly changing technology, challenges in effectively using competitive outsourcing, and fluctuating funding allocations require engineers to use all their resources wisely. We plan to chronicle those shifting responsibilities, career changes, and career opportunities, and to share brief noteworthy engineering information contributed by USDA Forest Service engineers. Please send your contributions to Sandy Grimm at SandraGrimm/WO/USDA@FSNOTES or sgrimm@fs.fed.us.

Career Changes (January to May 2003)

Geospatial Services and Technology Center (GSTC) and Remote Sensing Applications Center (RSAC)

Mel Bacon retired in January after 19 years as budget officer for GSTC and RSAC and more than 37 years of Federal Government service. Charlene McDougald assumed Mel's former position. Bob Earl, former unit leader for applications and technical assistance in the GIS Group, also retired in January. Loren (Bryce) Eddy was promoted to contracting officer for the Utah Procurement Center to succeed Janie Durk, who has transferred to the Rural Housing Development agency in Salt Lake City. RSAC's Paul Greenfield is now with WO Engineering.

Missoula Technology and Development Center (MTDC)

Susan Eichthen has joined MTDC as the front desk receptionist through a reassignment from Region 1 under the senior citizen employment program (SCSEP). Deborah Mucci has assumed more responsibilities and earned a promotion. She is a mechanical engineering technician who performs cartography and drafting functions for the center.

San Dimas Technology and Development Center (SDTDC)

Ryan Becker has been promoted to a mechanical engineer-project leader position. Dale Dague is on a 90-day detail to WO Fire & Aviation Management as the liaison to the U.S. Federal Emergency Management Administration for disaster assistance. Michael Mitchell, a civil engineer from the Lolo National Forest, has been promoted to senior project leader. David Haston, a mechanical engineer and project leader, is joining SDTDC from a fire apparatus manufacturing company.

Washington Office (WO)

Paul Greenfield is the new remote sensing program manager. Bill Hamele is the acting facilities program manager while Josiah Kim is on a 6-month detail as acting deputy director of engineering in Region 9. Fong Ou retired in April as the WO staff's information systems analyst and Jim Padgett retired in January from his position as program manager for geotechnical

and dams engineering. Leslie Walrath, formerly with the U.S. Army Forces Command in Fort Bragg, NC, joined Tom Moore and Sherri Clark on the Environmental Compliance and Protection staff as the water and waste management program manager. In May, Kathy Zirbser, who was formerly with the WO budget staff, headed west to become a regional environmental engineer in Ogden, UT. Mike Ash, formerly deputy director of engineering, became deputy regional forester for the Pacific Northwest Region in mid-April after a stint as the team leader on the Sierra Nevada Forest Plan Amendment Review Team in Vallejo, CA.

In Memoriam

Brian Lesser, longtime computer specialist with WO Engineering, died on February 17. We will miss his quiet presence.

2002 Engineering Field Notes Article Award Nominations

We appreciate the effort of each of our authors and readers in making *Engineering Field Notes* (EFN) 2002 a valuable resource. Authors highlighted Infra's giant strides in meeting Government mandates for U.S. Department of Agriculture (USDA) Forest Service fiscal accountability, satellite remote-sensing contributions to the 2002 Winter Olympics, repairs to the ravages of the McClain Creek Landslide, benefits of the Public Forest Service Roads concept, and WO Engineering's role in responding to the Burned Area Emergency Rehabilitation (BAER) program. Once again, authors shared their knowledge, experience, and insight as USDA Forest Service engineers at all levels and from all regions.

Please take this opportunity to select the top three articles for 2002. Remember, this is a one-person, one-vote system. Your vote counts. Consider, for example, which article you found the most informative, beneficial, and interesting; which article helped your unit save money; and which article helped you develop more effective ways of accomplishing your work.

Just complete the nomination form by rating the articles from 1 (best) to 3 (third best). Note whether you believe an article has helped or will help the USDA Forest Service save money or resources. To send the form, e-mail your first, second, and third article selections to Sandy Grimm at SandraGrimm/WO/USDA@FSNOTES or sgrimm@fs.fed.us. Please vote by Friday, August 29, 2003.

Also be sure to share some of your engineering expertise with the EFN audience. Project reports, papers prepared for professional meetings, and handouts created to train field units are all potential EFN articles.

2002 Engineering Field Notes Article Award Nominations Form

Article	Author	Choice (1,2,3)	Dollars Saved
Infra To Celebrate 10th Anniversary and Launch Infra 5.0 http//fsweb.wo.fs.fed.us/eng/pubs/efn/efn-cont.htm	Claudine Bodin	_____	_____
Satellite Remote Sensing for the 2002 Winter Olympics http//fsweb.wo.fs.fed.us/eng/pubs/efn/efn-cont.htm	Paul H. Greenfield	_____	_____
The McClain Creek Landslide Installation of Drainage Systems, August to October 2001 http//fsweb.wo.fs.fed.us/eng/pubs/efn/efn-cont.htm	Terri Anderson and Rodney Prellwitz	_____	_____
Public Forest Service Roads—A “Service First” Approach To Managing Our National Forests http//fsweb.wo.fs.fed.us/eng/pubs/efn/efn-cont.htm	Thomas L. Moore	_____	_____
Supporting the Burned Area Emergency Response (BAER) Program with Remotely Sensed Imagery http//fsweb.wo.fs.fed.us/eng/pubs/efn/efn-cont.htm	Andrew Orlemann	_____	_____

Engineering Field Notes

Administrative Distribution

The Series

The Engineering Management Series is published periodically as a means for exchanging engineering-related ideas and information on activities, problems encountered and solutions developed, and other data that may be of value to engineers Servicewide.

Submittals

Field personnel should send proposed articles for *Engineering Field Notes* (see Guidelines for Authors on the inside front cover) through their regional information coordinator for review by the regional office to ensure inclusion of information that is accurate, timely, and of interest Servicewide.

Regional Information Coordinators

R-1	Marcia Hughey	R-8	Bob Harmon
R-2	Acting, Veronica Mitchell	R-9	Cliff Denning
R-3	Marjorie Apodaca	R-10	Aaron Weston
R-4	Walt Edwards	WO	Sandy Grimm
R-5	Gwen Harris-Nishida	WO Infra	Tah Yang
R-6	Cheryl Clark		

Center Information Coordinators

GSTC	Marcia Thomas	MTDC	Bert Lindler
RSAC	Keith Lanham	SDTDC	Susan Clements

Inquiries

Regional information coordinators should send material for publication and direct any questions, comments, or recommendations to the following address:

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